Claims

We claim :

1. A VUV-excited device including a discharge chamber with a phosphor coating, the discharge chamber containing a rare gas or rare gas mixture, the phosphor coating being applied to an inner surface of the discharge chamber, the device when operated generating a discharge which emits vacuum ultraviolet radiation as a primary source of excitation, the phosphor coating containing a europium-activated, calcium-substituted barium hexa-aluminate phosphor.

2. The VUV-excited device of claim 1 wherein the europium-activated, calcium-substituted barium hexa-aluminate phosphor has a composition which is represented by $Ba_{1.29-x-y}Ca_xEu_yAl_{12}O_{19.29}$, wherein $0 < x < 0.25$ and $0.01 < y < 0\ 20$.

3. The VUV-excited device of claim 1 wherein the device generates a vacuum ultraviolet light having a wavelength of 147 nm to 173 nm.

4. The VUV-excited device of claim 1 wherein the discharge chamber contains xenon or a mixture of xenon and helium.

5. The VUV-excited device of claim 1 wherein the phosphor coating additionally contains a phosphor selected from the group consisting of europium-activated barium magnesium aluminate, europium-activated barium magnesium aluminate coated with aluminum oxyhydroxide, and $(Gd,La)PO_4$:Tm,Li.

6. The VUV-excited device of claim 1 wherein the phosphor coating additionally contains a $(Gd,La)PO_4$:Tm,Li phosphor and a ratio of the europium-activated, calcium-substituted barium hexa-aluminate phosphor to the $(Gd,La)PO_4$:Tm,Li is in the range from 2:1 to 20:1 by weight.

7. The VUV-excited device of claim 1 wherein the europium-a substituted barium hexa-aluminate phosphor is coated with aluminum

8. A VUV-excited device including a discharge chamber with a phosphor coating, the discharge chamber containing a rare gas or rare gas mixture, the phosphor coating being applied to an inner surface of the discharge chamber, the device when operated generating a discharge which emits vacuum ultraviolet radiation as a primary source of excitation, the phosphor coating containing a europium-activated, calcium-substituted barium hexa-aluminate phosphor having a composition which is represented by $Ba_{1.29-x-y}Ca_xEu_yAl_{12}O_{19.29}$, wherein $0 < x < 0.25$ and $0.01 < y < 0\ 20$.

9. The VUV-excited device of claim 8 wherein the device generates a vacuum ultraviolet light having a wavelength of 147 nm to 173 nm.

10. The VUV-excited device of claim 8 wherein the discharge chamber contains xenon or a mixture of xenon and helium.

11. The VUV-excited device of claim 8 wherein the phosphor coating additionally contains a phosphor selected from the group consisting of europium-activated barium magnesium aluminate, europium-activated barium magnesium aluminate coated with aluminum oxyhydroxide, and $(Gd,La)PO_4$:Tm,Li.

12. The VUV-excited device of claim 8 wherein the phosphor coating additionally contains a $(Gd,La)PO_4$:Tm,Li phosphor and a ratio of the europium-activated, calcium-substituted barium hexa-aluminate phosphor to the $(Gd,La)PO_4$:Tm,Li is in the range from 2:1 to 20:1 by weight.

13. The VUV-excited device of claim 8 wherein the europium-activated, calcium-substituted barium hexa-aluminate phosphor is coated with aluminum oxyhydroxide.

14. A method of generating blue light comprising exciting a blue-e with vacuum ultraviolet radiation, the blue-emitting phosphor compris activated, calcium-substituted barium hexa-aluminate phosphor.

15. The method of claim 14 wherein the europium-activated, calcium-substituted barium hexa-aluminate phosphor has a composition which is represented by $Ba_{1.29-x-y}Ca_xEu_yAl_{12}O_{19.29}$, wherein $0 < x < 0.25$ and $0.01 < y < 0$ 20.

16. The method of claim 14 wherein the device generates a vacuum ultraviolet light having a wavelength of 147 nm to 173 nm.

17. The method of claim 15 wherein the device generates a vacuum ultraviolet light having a wavelength of 147 nm to 173 nm.

18. The method of claim 14 wherein the phosphor coating additionally contains a phosphor selected from the group consisting of europium-activated barium magnesium aluminate, europium-activated barium magnesium aluminate coated with aluminum oxyhydroxide, and $(Gd,La)PO_4$:Tm,Li.

19. The method of claim 14 wherein the phosphor coating additionally contains a $(Gd,La)PO_4$:Tm,Li phosphor and a ratio of the europium-activated, calcium-substituted barium hexa-aluminate phosphor to the $(Gd,La)PO_4$:Tm,Li is in the range from 2:1 to 20:1 by weight.

20. The method of claim 14 wherein the europium-activated, calcium-substituted barium hexa-aluminate phosphor is coated with aluminum oxyhydroxide.